RECENT LITERATURE.

Grinnell's 'The Biota of the San Bernardino Mountains.'[1] — During the seasons of 1905, 1906, and 1907, the author devoted considerable time, often aided by several assistants, in investigating the fauna and flora of the San Bernardino Mountains in southern California, which, from their altitude and isolation, offer an attractive field for the study of distribution. The present report of his researches includes a consideration of the life zones of the region; descriptions of the localities visited, with special reference to the faunal complexion of each; a discussion of the bird population and the influences modifying it; a list of the important species of plants, with notes on their distribution; a list of the birds of the region (139 species), with a detailed record of the distribution of each, with biographical and critical notes on many of them; and similar lists of the mammals and reptiles.

The San Bernardino region rises from a base level, on the south side, of from 1500 to 2500 feet, and on the north side of about 4000 feet, to the maxima of 10,600 (San Bernardino Peak) and 11,485 feet (San Gorgonio Peak), and thus includes the life zones from the Lower Sonoran to the Alpine-Arctic. The limits of these several zones are discussed, with lists of the plants that characterize them.

Under the caption 'Bird Population and its Modifying Influences,' the food supply is considered to be the factor that determines the maximum number of birds that can exist in a given region. "Competitive struggle between species has led to the adoption of remote and otherwise unexplainable habitats, temporary or constant. It has also led to the development of various and perfected means of food-getting." In this connection attention is called to the "almost universal exodus in July," from the coastal lowlands of southern California, " of many of the birds of the 'summer-visitant' category which have bred and raised broods during April, May and June." A considerable number of species (which he enumerates) "become scarce, or disappear altogether towards the end of July. . . . when everything becomes excessively dry: among plants most annuals have died, and the perennials have ceased active growth; insects become relatively rare, except along watercourses. The May bird population, which is abundant, cannot continue to be supported after this 'winter' [dry] season sets in, and the result is, they must move elsewhere." He has found that they then move up to the mountains, in families of young and old, where the climate is moister, where vegetation still flourishes, and where insects are abundant.

"All this invasion of the higher altitudes occurs when spring and summer

[1] The Biota of the San Bernardino Mountains. By Joseph Grinnell. University of California Publications in Zoology, Vol. V, No. 1, pp. 1–170, pll. i–xxiv. December 31, 1908.

are just dawning there, but when the foothills and plains below are becoming dry and barren under the July heat, no longer productive of the food-supply which they were in a condition to offer earlier in the season. I believe these relative conditions prevail throughout southern California. Without the mountains to accommodate the excess of bird population, which could not be supported in late summer on the withered lowlands, we would have fewer birds in the spring. The 'resident' species return to the lowlands when the cold begins to reduce the food supply in the mountains; and, what is also noteworthy, so do the 'summer visitants,' which thus become transients for a few days in the fall as they pass back through the lowlands on their way south, or rather southeastward. These latter, therefore, undertake three distinct migratory journeys during the year: from their winter habitat northwestward to their spring breeding-place, from the latter up, and often northwards, to their summer feeding-grounds, and then back down and then southeastward to their winter habitat."

These well-attested facts have an interesting and important bearing upon the general subject of bird migration, and especially upon the origin of migration. As said later by Grinnell: "The geometric ratio of reproduction makes the population of a species an elastic quantity, expanding into any favorable food area presenting itself. And the masses of different species press against one another, like soap-bubbles, crowding and jostling as one species acquires, through modification of food-getting powers and perfected adaptability to other conditions, some advantage over another." In this connection is discussed the mortality of birds and its causes, from the standpoint of the author's observations in southern California.

The report on the birds (pp. 50–54), like those on the mammals and reptiles, consist of extensively annotated lists, relating to the habits and local distribution of the species. The illustrations include a colored map (plate i) of the life zones of the region, and a transverse profile, also in color (plate ii), indicates both their vertical and horizontal extent. Most of the remaining twenty-two plates are from photographs, and represent types of vegetation and landscapes.— J. A. A.

Grinnell on Birds of Southeastern Alaska.— "In the spring of 1907 a party was organized and outfitted by Miss Annie M. Alexander, for the purpose of exploiting the fauna of certain islands. The party consisted of Mr. and Mrs. Frank Stephens, Mr. Joseph Dixon, Mr. Charles Littlejohn, and Miss Alexander herself, who headed the expedition." The report on the work accomplished [1] consists of nearly one hundred pages, illustrated with two plates and a few text figures. The introduction and the report on the birds are by Dr. Joseph Grinnell; the 'descriptions of localities' are by Frank Stephens and Joseph Dixon; the report on the

[1] Birds and Mammals of the 1907 Alexander Expedition to Southeastern Alaska. University of California Publications in Zoology, Vol. V, No. 2, pp. 171–264, pll. xxv, xxvi, and text figs. 1–4. February 18, 1909.